



Backpack Designer

Performance Task

Introduction

Your job is to design a specific backpack design based on the needs of a targeted user or audience. This design will be based on the utility, comfort and any unique geographical, historical or environmental needs connected to your chosen user or audience. You will need to conduct research in order to begin the ideation process. Be prepared to discuss the scope of your research, and the decisions that your team made in order to best create your specific design.

Some examples of different scenarios and/or individuals to consider when choosing a targeted user or audience:

- Sacajawea
- Harriet Tubman
- Allied Soldiers on D-Day June 6, 1944
- Workers creating the Hoover Dam
- Civil War Soldiers
- First Responders on 9-11-01
- Japanese students modern day
- Students in the South Sudan modern day
- Hikers in the Amazon River basin
- Sustainable Mt. Everest Hiker
- Marco Polo
- Fema Rescue Team

Check out the following resources below to help launch your ideas and research:

- [The Evolution of The Modern Backpack](#)
- [An American History of the Backpack](#)
- [A Brief History of Backpacks](#)
- [Unpacking the History of the Backpack](#)
- [A Brief History of the Modern Backpack](#)

Big Idea / Essential Questions

Big Idea

- An efficient world requires that humans develop capabilities to solve challenges and improve products for the way we live.
- Geometric relations can be described, analyzed, and classified based on spatial reasoning and/or visualization.

Essential Questions

- How would you use problem solving methods to the development of a new inventions and innovations?
- How are spacial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?

G.R.A.S.P.

Goal

You have just been asked to create a specific backpack design for a chosen individual or audience. This job will require problem solving and research skills pertaining to the design, materials, and usability of the backpack(s). You will need to create various models through the process of ideation. Following the ideation, you should select a design that incorporates advanced sketching and that represents three views of your special backpack design.

Role

You are part of a team of backpack designers. Your team's challenge is to create a new backpack design that will incorporate the needs of your chosen individual or targeted audience. You will need to conduct research on your target audience and consider what should be included, changed, or improved in the design and materials.

Audience

The target audience for your backpack will need to be determined. Your chosen audience will be using the backpack for a specific purpose. At the unveiling, you will need to share the scope of your research, the decisions you made about the redesign, and a full-size model of the prototype. It will also be helpful to share the necessary materials and design options. Lastly, don't forget to consider the following important elements:

- Design
- Dimensions

- Material
- Storage capacity
- Overall utilization

Situation

Your job is to design a specific backpack design based on the needs of a targeted user or audience. This design will be based on the utility, comfort and any unique geographical or environmental needs connected to your chosen user or audience. You will need to conduct research in order to begin the ideation process.

You should create a minimum of five sketches of your first suggestions related to design improvements. Next, you should prioritize your designs by selecting one for the creation of advanced sketches and in three separate views. These sketches will include dimensions, volume, pocket design and placement, as well as the appropriate material selections. Be prepared to discuss the scope of your research, and the decisions that your team made in order to best create your specific design. your target audience.

What attributes do you want to include in your backpack to help meet the needs of your target audience?

What aesthetic qualities should you consider for the design of your backpack to meet the needs of your target audience?

What design constraints must you consider based upon the user and the environment in which the backpack will be used?

Products

1. Press Release

Create a "press release" to inform the local community and consumers about your new backpack design. Remember to share information related to the dimensions and volume of your backpack and why they matter. Also include any critical attributes and aesthetics that will encourage the target audience to purchase this new backpack. Keep in mind the general needs and any historical, geographical, or environmental factors that will apply to the intended user.

A standard press release starts with a catchy headline and has a photo or illustration of the product. Next it tells who would want the product, what the product does, why the product is unique, when the product will be available, where the product will be available, and how the customer can get the product.

- What makes your design different than other backpack designs and who is the target audience?
- When and where will the backpack be available?

Press Release - Backpack Design

Achievement Levels	1	2	3	4
Problem Solving and Design (x1)	The product minimally solves the problem by considering needs of the target audience.	The product somewhat solves the problem by considering attributes, aesthetics and needs of	The product sufficiently solves the problem by addressing the attributes, aesthetics and needs of the target audience through	The product thoroughly solves the problem by addressing the attributes, aesthetics and needs of the target audience through the

Achievement Levels	1	2	3	4
		the target audience.	the guidelines and requirements provided.	guidelines and requirements provided.
Engineering Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Materials and Environment (x1)	Product demonstrates minimal understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates some understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates satisfactory understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates strong understanding of the properties of materials selected as related to the environment they will be utilized used.
Argumentative/Persuasive Reasoning (x1)	The writing presents minimal arguments to support claims with clear reasons and relevant evidence.	The writing presents some argument to support claims with clear reasons and relevant evidence.	The writing presents sufficient arguments to support claims with clear reasons and relevant evidence to persuade the reader.	The writing presents strong arguments to support claims with clear reasons and relevant evidence to persuade the reader.

2. Demonstration

Create a plan to introduce your backpack design to an audience. Step one will be to identify the target audience. Your presentation should be in the form of a sales pitch and be between 1-2 minutes. This presentation should include the important details and critical attributes of the backpack. You will want to highlight why this backpack was designed uniquely for the user. Be prepared to defend your reasons for making the choices that you did and also discuss the design constraints of your final product.

- Who is your target audience for the backpack?
- What materials will you use to make your backpack?
- What is it you most want people to know and see about your backpack design?

Demonstration - Backpack Design V2

Achievement Levels	1	2	3	4
Engineering Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Materials and Environment (x1)	Product demonstrates minimal understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates some understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates satisfactory understanding of the properties of materials selected as related to the environment they will be utilized used.	Product demonstrates strong understanding of the properties of materials selected as related to the environment they will be utilized used.
Problem Solving and Design (x1)	The product minimally solves the problem by considering needs of the target audience.	The product somewhat solves the problem by considering attributes, aesthetics and needs of the target audience.	The product sufficiently solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.	The product thoroughly solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.

Achievement Levels (x1)	1 Product minimally explains the importance of volume and its calculation when creating a new backpack.	2 Product somewhat explains the importance of volume and its calculation when creating a new backpack.	3 Product explains the importance of volume and its calculation when creating a new backpack.	4 Product clearly explains the importance of volume and its calculation when creating a new backpack.
Persuasive Speaking (x1)	Audience is not persuaded due to incomplete explanation.	Audience may or may not be persuaded through partial explanation provided that touches upon important points.	Audience is somewhat persuaded through adequate explanation that includes important points supported by facts and details.	Audience is persuaded through thorough explanation which emphasizes important points supported by facts and details.

3. ePortfolio

Create an electronic portfolio that provides a number of sketches and drawings from the beginning of the design process through to the final scale drawing with labels for attributes and aesthetics where appropriate. This portfolio should contain pictures/illustrations of your backpack from a variety of angles. Drawings should showcase special features that make the backpack attractive to the target audience. Your portfolio should also include specifications such as number of pockets, total volume, special padding for comfort and so forth. A list of special features should be available so that a viewer can easily identify all of the options available.

- What are some different types of backpacks and what make them unique?
- What makes your backpack unique and appealing?
- What is the volume of your backpack and what are one or two advantages of its volume?

ePortfolio - Backpack Design V2

Achievement Levels	1	2	3	4
Problem Solving and Design (x1)	The product minimally solves the problem by considering needs of the target audience.	The product somewhat solves the problem by considering attributes, aesthetics and needs of the target audience.	The product sufficiently solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.	The product thoroughly solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines and requirements provided.
Engineering Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Technology Applications and Design Process (x1)	Technology applications selected minimally enhance the design drawings, support the claims, and emphasize the design process.	Technology applications selected somewhat enhance the design drawings, support the claims, and emphasize the design process.	Technology applications selected sufficiently enhance the design drawings, support the claims, and emphasize the design process.	Technology applications selected strongly enhance the design drawings, support the claims, and emphasize the design process.
Mathematics and Modeling (x1)	Images exhibit minimal attention to detail in construction and synthesis of geometric figures to create the products.	Images exhibit some attention to detail in construction and synthesis of geometric figures to create the products.	Images exhibit satisfactory attention to detail in construction and synthesis of geometric figures to create the products.	Images exhibit great attention to detail in construction and synthesis of geometric figures to create the products.
Volume	Product minimally explains the importance of volume	Product somewhat explains the importance of volume	Product explains the importance of volume and its	Product clearly explains the importance of volume and its

4. Model

Create a life-sized model or three-dimensional computer generated image of the backpack that your team has designed. You may use classroom materials or recycled fabrics and materials. Specify any special materials that will be needed to construct each part of the backpack and explain your reason(s) for choosing that fabric. Include all of the dimensions of the backpack as well as its volume. Also be prepared to present three or four special modifications that you added to your design to improve the comfort, durability, or quality of the backpack.

- What are some different types of backpacks and what make them unique?
- What materials will you use to construct your model?
- What features, pockets, or straps will you include on your backpack and what will be the purpose of them?

Model - Backpack Design

Achievement Levels	1	2	3	4
Engineering Design (x1)	Product demonstrates minimal understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates some understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates adequate understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.	Product demonstrates strong understanding of the criteria and constraints of the design problem with regard to size, materials, and function of the product.
Problem Solving and Design (x1)	The product minimally solves the problem by considering needs of the target audience.	The product somewhat solves the problem by considering attributes, aesthetics and needs of the target audience.	The product sufficiently solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines provided.	The product thoroughly solves the problem by addressing the attributes, aesthetics and needs of the target audience through the guidelines provided.
Mathematical Modeling (x1)	The mathematical criteria necessary for a successful design are minimally applied through the use of mathematical tools and precision.	The mathematical criteria necessary for a successful design are somewhat applied through the use of some appropriate tools and consideration for precision.	The mathematical criteria necessary for a successful design are adequately applied through the strategic use of appropriate tools and attention to precision.	The mathematical criteria necessary for a successful design are fully applied through the strategic use of appropriate tools and attention to precision.
Model (x1)	The model is a minimally accurate with respect to the plans, diagrams, and/or drawings.	The model is a somewhat accurate reproduction of the plans, diagrams, and/or drawings. It has some detail and some critical components.	The model is a mostly accurate reproduction of the plans, diagrams, and/or drawings. It has attention to detail with some critical aspects in place.	The model is an accurate reproduction of the plans, diagrams, and/or drawings. It has great attention to detail.
Measurements & Volume (x1)	Product shows few of the measurements or volume.	Product shows some of the measurements and volume with few appropriate units.	Product shows many of the measurements and a mostly accurate calculation of the volume with appropriate units.	Product shows all measurements and an accurate calculation of the volume with appropriate units.

5. Programming Flowchart

Your design team wants to create a product design tool that will allow you to customize your intended design. Using this tool will help students see desired attributes and

aesthetics that are available for this particular backpack design. Your team will need to create a programming flow chart that is a diagram that will help demonstrate how your custom design can vary based on the specific needs of the user/audience.

- What is a decision tree and how is it helpful when developing an application or website?
- Why is building a flowchart an important step before developing an application or website?

Programming Flowchart

Achievement Levels	1	2	3	4
Decision Making (x1)	Is missing elements that should have been considered for selecting a final end-state. Poorly communicates the final end-state selection process	Is missing elements that should have been considered for selecting a final end-state.	Somewhat effectively demonstrates important considerations and the process that contributes to selecting a final end-state.	Effectively demonstrates important considerations and the process that contributes to selecting a final end-state.
Layout (x1)	The flow chart is cluttered looking or confusing. It is often difficult to locate important elements.	The flow chart has a usable layout, but may appear busy or boring. It is easy to locate most of the important elements.	The flow chart has an attractive and usable layout. It is easy to locate all important elements.	~The Flow chart has an exceptionally attractive and usable layout. It is easy to locate all important elements. White space, graphic elements and/or alignment are used effectively to organize material.
Logic (x1)	There is no logic to the flow chart. The flow chart has no order and is hard to understand.	The flow chart is present but there is a question as to which step goes in which order.	The flow chart is logical and the directions allow the reader to complete the task.	The flow chart is logical and the directions help the reader to (adequately) complete the task.
Spelling and Grammar (x1)	Several spelling or grammar errors	No more than 3 spelling or grammar errors.	No more than a couple of spelling or grammar errors.	No spelling or grammar errors.